

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested. Claims 1-4 are pending, Claims 3 and 4 having been amended by way of the present amendment.

In the outstanding Office Action Claims 3 and 4 were rejected under 35 U.S.C. § 101; Claims 1 and 2 were rejected under 35 U.S.C. § 103 as being unpatentable over “common knowledge”; and Claims 1 and 2 were rejected as being unpatentable over Yamamoto (U.S. Patent No. 6,503,788).

In reply, Claims 3 and 4 have been amended, consistent with 35 U.S.C. § 101. The basis for the rejection is that these claims were directed to neither “a process” nor an “apparatus”. It is believed that Claims 3 and 4 originally, and now as clarified, are directed to an apparatus. To the extent any of the limitations contained in Claims 3 and 4 are construed as being a process step, Applicants note that this is not an inconsistency, but is rather permitted by M.P.E.P. § 2113. However, if the Examiner still has questions or concerns regarding Claims 3 and 4, the Examiner is invited to telephone the undersigned so that mutually agreeable claim language may be identified.

Claim 1 is directed to a method for manufacturing a planar lightwave circuit having a metallic film. The steps include preparing a mask having a hole formed in approximately the same shape as the metal film. A second step is for arranging the mask such that the hole of the mask corresponds to a manufacturing portion on the planar lightwave circuit, where the metallic film is to be formed. The last step is for manufacturing the metallic film in the manufacturing portion on at least one of the front or rear faces of the planar lightwave circuit through the hole of the mask. Dependent Claim 2 further defines that the metallic film is manufactured after performing an annealing process of the planar lightwave circuit.

The outstanding Office Action asserts that the invention defined by Claims 1 and 2 would have been obvious “because these manufacturing steps are common knowledge”. Applicants respectfully traverse the rejection. In order to provide a *prima facie* case of obviousness, there must be (1) some suggestion or motivation to modify the reference or combine the reference teachings”, (2) be a reasonable expectation of success, and (3) the prior art reference must teach or suggest all of the claim limitations (M.P.E.P. § 2143). As described in M.P.E.P. § 2143, the “fact that the claimed invention is within the capabilities of one of ordinary skill in the art is not sufficient by itself to establish *prima facie* obviousness”. This is such the case with the present rejection.

The Office Action asserts that the “manufacturing steps are common knowledge” and would have been obvious to one of ordinary skill in the manufacturing process. However, there would be no motivation or advantage of using this method, unless the hypothetical person of ordinary skill in the art had the advantage of the observations made by the present inventors. More particularly, as discussed in the present specification, beginning at page 14, first full paragraph, and continuing to the second line of page 16, it was the present inventors who recognized the source of the problem with conventional manufacturing technique (see, e.g., Figures 5A-5E). In the context of a planar lightwave circuit, there is a need to have precise alignment of components, to avoid the shifting of each transmitting light central wavelength of the arrayed waveguide grating. It was the present inventors who recognized that when the construction of an arrayed waveguide grating is combined with a method for correcting a shift in the transmitting light central wavelength by an annealing process, it is possible to manufacture an excellent waveguide grating able to compensate the shift in light due to temperature dependence (specification, page 13, last paragraph, continuing to page 14). The present inventors further recognized that a technique employed according to conventional practice where an annealing process is performed with respect to the arrayed

waveguide grating the metallic film 1 becomes melted, oxidized and deteriorated by the annealing process at high temperature. Thus, it was the present inventors who recognized the need to perform the annealing process before the manufacture of the metallic film 1.

Based on the observations by the present inventors, the manufacture of planar lightwave circuits was made more reliable by a change in process. In particular, recognizing that the wavelength shift of the light passed through the lightwave circuit is affected by temperature, and these wavelengths can be set through an annealing process, it was the present inventors who recognized that the combination of manufacturing the arrayed waveguide grating by using a mask after correction for light shift has been performed by an annealing process. Conventional techniques, even if such observations were made, would have relied on the common practice of annealing after the metallic films had been formed. However, such techniques would not have given rise to a reasonable expectation of success due to the degradation of the metallic films resulting from the high temperatures. Accordingly, it is respectfully submitted that by recognizing the source of the problem (properly managing wavelength shift, with the need to reliably form metallic film) is due to the present inventors' observations.

As identified in M.P.E.P. § 2141.02, it is the inventors' discovery of the source/cause of a problem that is part of the "as a whole" inquiry, that appears to have been lacking in the present Office Action. Moreover, in re Sponnoble, 405 F.2d 578, 585, 160 USPQ 237, 243 (CCPA 1969), made clear that "a patentable invention may lie in the discovery of the source of a problem even though the remedy may be obvious once the source of the problem is identified. This part of the 'subject matter as a whole' which should always be considered in determining the obviousness of an invention under 35 U.S.C. § 103". Accordingly, it is respectfully submitted that the present rejection of Claims 1 and 2, based on being obvious over "common knowledge", should be withdrawn, as it does not provide a *prima facie* case of

obviousness, and fails to recognize that it was the present inventors who discovered this source of the problem and identified a solution to that problem based on their observations. Accordingly, it is respectfully requested that the rejection of Claims 1 and 2 be withdrawn.

Claims 1 and 2 stand rejected as being unpatentable over Yamamoto. The basis of the rejection is that Yamamoto discloses everything, but does not disclose the film to be “metallic”. The Office Action then asserts that it would have been obvious to select a “known material” on the basis of its suitability for the intended purpose and metallic films are “well known in the art”.

However, once again, this analysis made in the Office Action is incomplete and does not provide a *prima facie* case of obviousness. In particular, the claim specifically requires a metallic film. As discussed above, it is the combination of an annealed planar lightwave circuit (so as to fix the wavelengths) in combination with the forming of metallic films (not any other type of film) that is claimed. The observations made by the inventors were that if the annealing process is done after the metallic films are formed, then the integrity of the metallic films are destroyed. Accordingly, the assertion that one of ordinary skill in the art would have been motivated to replace film the materials shows a lack of appreciation that it was the inventors who determined that the integrity of the metallic films would be destroyed. Accordingly, the assertion that one of ordinary skill in the art would have been motivated to replace the materials in Yamamoto with the metallic film, is based on improper hindsight reasoning and would not provide a reasonable expectation of success. As previously discussed, annealing performed as an intermediate process would destroy the integrity of the metallic films. Accordingly, by mere substitution, as suggested by the outstanding Office Action, without the observations made by the present inventors, would have resulted in the device in Yamamoto having metallic films that are later degraded as a result of being exposed

to high temperatures in an annealing process. Consequently, it is respectfully submitted that Claims 1 and 2 patentably define over the asserted prior art.

Consequently, in view of the present amendment and in light of the foregoing comments, it is respectfully submitted that the invention defined by Claims 1-4, as amended, comply with 35 U.S.C. § 101 and is patentable over the asserted prior art. The present application is therefore believed to be in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully submitted,

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